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10/019,882	04/15/2002	Yan Yonghong	42390.P8351	8063

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Blakely Sokoloff Taylor & Zafman  
12400 Wilshire Boulevard  
Los Angeles, CA 90025

EXAMINER
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WOZNIAK, JAMES S

ART UNIT	PAPER NUMBER
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2626

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03/18/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/019,882	<b>Applicant(s)</b> YONGHONG, YAN	
	<b>Examiner</b> James S. Wozniak	<b>Art Unit</b> 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4 and 12 is/are allowed.
- 6) ☒ Claim(s) 1-3,5,7-11,13 and 15-30 is/are rejected.
- 7) ☒ Claim(s) 6 and 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 April 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. In response to the office action from 9/25/2007, the applicant has submitted a request for continued examination, filed 12/26/2007, amending claims 4, 12, 16, 19, 23, and 27, while arguing to traverse the art rejection based on the limitation regarding marking misrecognized utterance sections and associating weights with those marked sections (*Amendment, Pages 10-11*). The applicant's arguments have been fully considered but are moot with respect to the new grounds of rejection in view of Barnard et al (*U.S. Patent: 7,216,079*).

2. The applicant argues that the inclusion of "computer-readable storage medium" has overcome the previous 35 U.S.C. 101 rejection (*Amendment, Page 9*). In response, the examiner notes that claims 16-30 still remain rejected as being directed to non-statutory subject matter because the "instructions" are not executed by a computer (*a generic processor in the claims*), not computer executable (*i.e., a computer program or computer-executable instructions*), and not stored or encoded on the computer-readable storage medium (*i.e., --storing-- instead of "having" instructions*), thus preventing the program's functionality from being realized.

***Response to Arguments***

3. Applicant's arguments have been fully considered but they are not persuasive for the following reasons:

With respect to **Claims 5, 13, 20, and 28**, the applicant first argues that Junqua (*U.S. Patent: 6,253,181*) teaches a ratio or “difference of two logarithms, not the difference of the likelihood as shown in claim 5” (*Amendment, Pages 13-14*). In response, the examiner points out that the difference between likelihoods for a particular frame in the claimed invention, although referred to as “an average likelihood difference” for a frame, is actually defined as a difference between log-likelihoods (“*log likelihood of hypothesis word...counter parts for the reference string*”). Thus, the calculation disclosed by Junqua, which provides an average difference per utterance segment in the form of a difference between log-likelihoods of a correct reference and another hypothesis (*Col. 5, Lines 24-57 and Col. 7, Lines 15-31*), teaches the calculation recited in the aforementioned claims. In response to the applicant’s arguments that no motivation has been provided by the examiner for combining the teachings of the prior art of record, the examiner notes that such motivation has been provided as was pointed out in the previous Office Action (*see Pages 5-6*). In response to the applicant’s argument that Junqua fails to teach “averaging the average likelihood over all error words” (*Amendment, Page 13*), the examiner points out that this limitation is not recited in claim 5. Instead, “averaging the average likelihood over all error words” is part of claim 4, which is indicated below as being allowable over the prior art of record. Thus, since Junqua was not relied upon to teach this limitation, such arguments are moot. In response to applicant's argument that the examiner's conclusion of

obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

### ***Claim Rejections - 35 USC § 101***

4. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5. **Claims 16-30** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

**Claims 16, 19, 23, and 27** are drawn to a “instructions” *per se*, as recited in the preamble and as such represent non-statutory subject matter. More specifically, the “instructions” are not “executable instructions” or “instructions executable by a computer”, stored on a computer readable medium (i.e., --storing computer-executable instructions-- instead of “having instructions”), and executed by a *computer*. Therefore, no practical application functionality is realized. See also MPEP § 2106.IV.B.1.a. See MPEP § 2106.IV.B.1.a.

Data structures not claimed as embodied in computer readable media are descriptive material *per se* and are not statutory because they are not capable of causing functional change in

the computer. See, e.g., *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure *per se* held nonstatutory). Such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention, which permit the data structure's functionality to be realized. In contrast, a claimed computer readable medium encoded with a computer program defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory. Similarly, computer programs claimed as computer listings *per se*, i.e., the descriptions or expressions of the programs are not physical “things.” They are neither computer components nor statutory processes, as they are not “acts” being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer, which permit the computer program's functionality to be realized. Thus, claims 16, 19, 23, and 27 and their dependents contain non-statutory subject matter.

### ***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this

subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. **Claims 1-3, 7-11, 15-18, 22-26, and 30** are rejected under 35 U.S.C. 102(e) as being anticipated by Barnard et al (*U.S. Patent: 7,216,079*).

With respect to **Claim 1**, Barnard discloses:

Calculating estimated weights for identified errors in recognition of utterances based on a reference string (*using reference strings to identify incorrectly recognized utterance sections and determining associated training weights, Col. 3, Line 64- Col. 4, Line 11; Col. 5, Lines 16-26; Col. 6, Lines 21-39; and Col. 9, Lines 47-67; and Fig. 3*);

Marking sections of the utterances as being misrecognized and associating the estimated weights with the sections of the utterances (*utterance segment locations that are incorrectly recognized are selected and associated with a training weight shift value, Col. 6, Lines 21-39; Col. 8, Lines 51-60; Col. 9, Lines 47-67; and Fig. 3*);

Using the weighted sections of the utterances to convert a speaker independent model to a speaker dependent model (*weighted utterance segments are used to gradually train an initial model for a particular speaker, Col. 3, Line 64- Col. 4, Line 11; and Col. 6, Lines 40-61*).

With respect to **Claim 2**, Barnard further discloses:

The method steps (a)-(c) are repeated at least once (*repeated processing is performed, Col. 3, Line 64- Col. 4, Line 11; and Col. 6, Lines 40-46*).

With respect to **Claim 3**, Barnard further discloses:

The utterances are converted into a recognized phone string a first time through applying the speaker independent model and thereafter through applying the most recently obtained speaker dependent model (*recognizer creates phoneme strings using an initial model that is*

*gradually/repeatedly trained, Col. 3, Line 64- Col. 4, Line 11; and Col. 6, Lines 40-46; and Fig. 3).*

With respect to **Claim 7**, Barnard further discloses:

*Different misrecognized words have different weights (variable weighting value, Col. 9, Lines 47-67).*

With respect to **Claim 8**, Barnard discloses:

*Recognizing utterances through converting the utterances into a recognized string (speech recognition generates a phoneme string, Col. 7, Lines 13-46);*

*Comparing the recognized string with a reference string to determine errors (location of errors is determined by comparing correct reference string and recognized string, Col. 8, Lines 51-60);*

*Calculating estimated weights for sections of the utterances (using reference strings to identify incorrectly recognized utterance sections and determining associated training weights, Col. 3, Line 64- Col. 4, Line 11; Col. 5, Lines 16-26; Col. 6, Lines 21-39; and Col. 9, Lines 47-67; and Fig. 3);*

*Marking the errors in the utterances and providing corresponding estimated weights to form adaptation enrollment data (utterance segment locations that are incorrectly recognized are selected and associated with a training weight shift value, Col. 6, Lines 21-39; Col. 8, Lines 51-60; Col. 9, Lines 47-67; and Fig. 3); and*

*Using the adaptation enrollment data to convert a speaker independent model to a speaker dependent model (weighted utterance segments are used to gradually train an initial model for a particular speaker, Col. 3, Line 64- Col. 4, Line 11; and Col. 6, Lines 40-61).*

With respect to **Claim 9**, Barnard further discloses:

The utterances are converted into the recognized string through applying the speaker independent model (*initial recognition model that is to be gradually adapted, Col. 3, Line 64- Col. 4, Line 15*).

With respect to **Claim 10**, Barnard further discloses:

Parts (b)-(e) are repeated until differences between the reference and recognized strings are less than a threshold (corrective action is only taken until a difference greater than a closeness threshold (*i.e., below an effective threshold measure of similarity*) is reached, *Col. 9, Lines 11-26; and Col. 10, Lines 14-22*).

**Claim 11** contains subject matter similar to Claim 3, and thus, is rejected for the same reasons.

**Claim 15** contains subject matter similar to Claim 7, and thus, is rejected for the same reasons.

With respect to **Claim 16**, Barnard discloses the method for marking and weighting misrecognized utterance sections for speaker training as applied to claim 1, implemented as a computer readable medium storing a program executable by a computer (*Col. 11, Line 49- Col. 12, Line 18*).

**Claims 17-18** contain subject matter respectively similar to Claims 2-3, and thus, are rejected for the same reasons.

**Claim 22** contains subject matter similar to Claim 7, and thus, is rejected for the same reasons.

With respect to **Claim 23**, Barnard discloses the method for marking and weighting misrecognized utterance sections for speaker training as applied to claim 8, implemented as a computer readable medium storing a program executable by a computer (*Col. 11, Line 49- Col. 12, Line 18*).

**Claims 24-26** contain subject matter respectively similar to Claims 9-11, and thus, are rejected for the same reasons.

**Claim 30** contains subject matter similar to Claim 7, and thus, is rejected for the same reasons.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claims 5, 13, 20, and 28** are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnard et al in view of Junqua (*U.S. Patent: 6,253,181*).

With respect to **Claims 5, 13, 20, and 28**, Barnard discloses the method for marking and weighting misrecognized utterance sections for speaker training, as applied to Claims 1, 8, 16, and 23. Nguyen does not specifically disclose that calculation of a weighting score that computes an average likelihood difference per frame, however Junqua discloses a calculation of a likelihood difference used in determining a speaker adaptation that utilizes an average of

likelihood difference scores associated with an incorrect recognition (*Col. 4, Lines 9-24; and Col. 5, Lines 15-67*). Junqua further discloses an equation similar to that recited in claim 5 for determining a log-likelihood difference in a speaker adaptation process that utilizes an average of likelihood scores (*Col. 5, Lines 15-67; and Col. 4, Lines 9-24*).

Barnard and Junqua are analogous art because they are from a similar field of endeavor in speaker adaptation systems. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Barnard with the likelihood difference calculation taught by Junqua in order to implement a high speed speaker adaptation system that is capable of providing a measure of recognition reliability (*Junqua, Col. 3, Lines 29-31; and Col.4, Lines 9-24*).

#### *Allowable Subject Matter*

10. **Claims 4 and 12** are allowable over the prior art of record.

11. The following is an examiner's statement of reasons for allowance:

With respect to **Claims 4 and 12**, the prior art of record fails to explicitly teach or fairly suggest a method for speaker adaptation that utilizes estimated weights based on misrecognized speech utterances as respectively recited in claims 4 and 12, wherein the estimated weights are calculated by computing an average likelihood difference per frame and then computing a weight value by averaging the average likelihood difference over error words (specification, page 6).

Although Barnard et al (*U.S. Patent: 7,216,079*) discloses that it is well known in the prior art to mark and weight misrecognized utterance sections for speaker training (*Col. 3, Line 64- Col. 4, Line 11; Col. 5, Lines 16-26; Col. 6, Lines 21-39; and Col. 9, Lines 47-67; and Fig. 3*) and Junqua (*U.S. Patent: 6,253,181*) teaches an equation for calculating an average likelihood difference, as applied to claim 5, Junqua does not teach averaging the average likelihood difference over all error words to determine a weight for speaker adaptation of a speech recognition model. Thus, claims 4 and 12 are allowable over the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

12. **Claims 19 and 27** are currently rejected under 35 U.S.C. 101, but would be allowable if rewritten to overcome said rejection.

13. The following is a statement of reasons for the indication of allowable subject matter:

With respect to **Claims 19 and 27**, the prior art of record fails to explicitly teach or fairly suggest a computer readable medium storing a program executed by a computer for speaker adaptation that utilizes estimated weights based on misrecognized speech utterances as respectively recited in claims 19 and 27, wherein the estimated weights are calculated by computing an average likelihood difference per frame and then computing a weight value by averaging the average likelihood difference over error words (specification, page 6).

Although Barnard et al (*U.S. Patent: 7,216,079*) discloses that it is well known in the prior art to mark and weight misrecognized utterance sections for speaker training (*Col. 3, Line 64- Col. 4, Line 11; Col. 5, Lines 16-26; Col. 6, Lines 21-39; and Col. 9, Lines 47-67; and Fig. 3*) and Junqua (*U.S. Patent: 6,253,181*) teaches an equation for calculating an average likelihood difference, as applied to claim 5, Junqua does not teach averaging the average likelihood difference over all error words to determine a weight for speaker adaptation of a speech recognition model. Thus, claims 19 and 27 contain allowable subject matter.

14. **Claims 6, 14, 21, and 29** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

15. The following is a statement of reasons for the indication of allowable subject matter:

With respect to **Claims 6, 14, 21, and 29**, the prior art of record fails to explicitly teach or fairly suggest a method for speaker adaptation that utilizes estimated weights based on misrecognized speech utterances, wherein the estimated weights are calculated by multiplying an average likelihood difference per frame calculated using the equation recited in claims 5, 13, 20, and 28 by the inverse of a number of misrecognized words for a particular speaker as per the equation recited in claims 6, 14, 21, and 29.

Although Barnard et al (*U.S. Patent: 7,216,079*) discloses that it is well known in the prior art to mark and weight misrecognized utterance sections for speaker training (*Col. 3, Line 64- Col. 4, Line 11; Col. 5, Lines 16-26; Col. 6, Lines 21-39; and Col. 9, Lines 47-67; and Fig.*

3) and Junqua (*U.S. Patent: 6,253,181*) teaches an equation for calculating an average likelihood difference, Junqua does not teach multiplying the calculated average likelihood by the inverse of a number of misrecognized words for a particular speaker as per the equation recited in claims 6, 14, 21, and 29.

### ***Conclusion***

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: See PTO-892.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632. The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached at (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/James S. Wozniak/  
James S. Wozniak  
Patent Examiner, Art Unit 2626